

Figure 1A

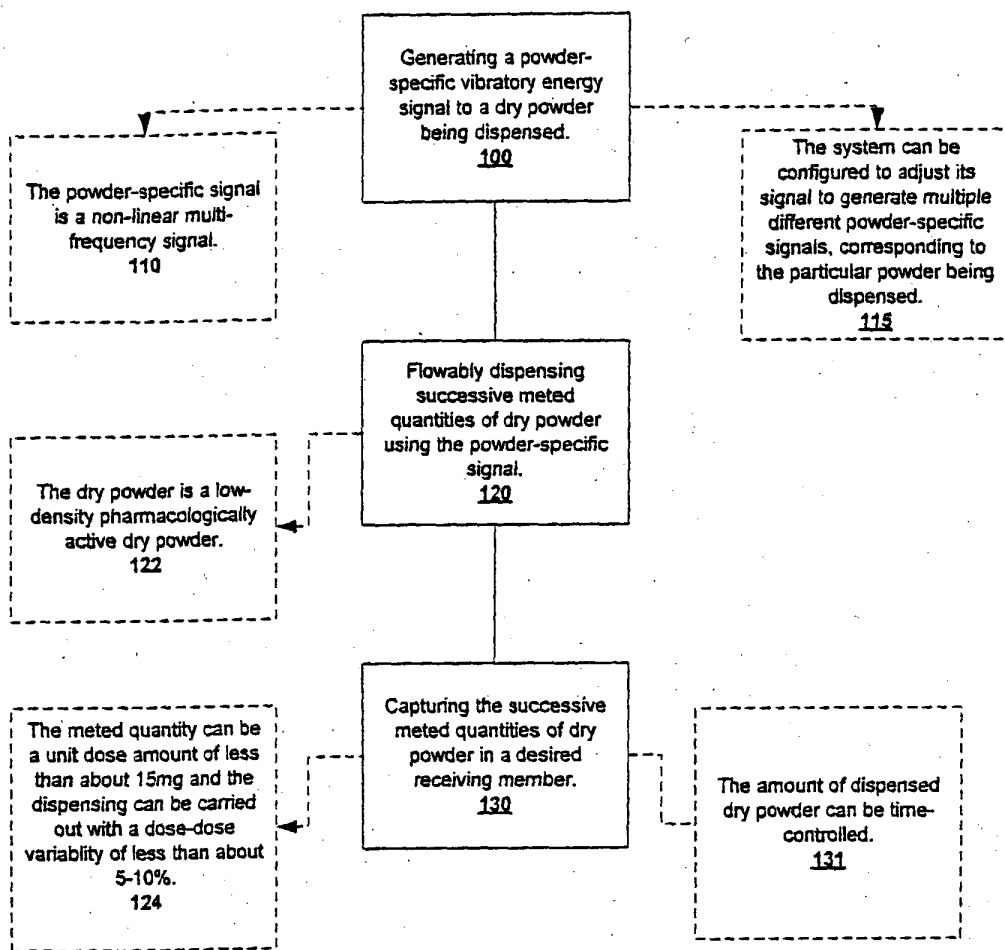


FIGURE 1B

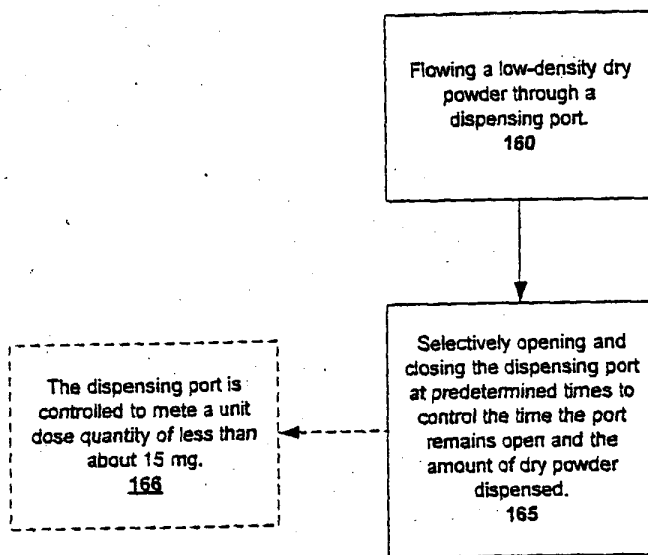
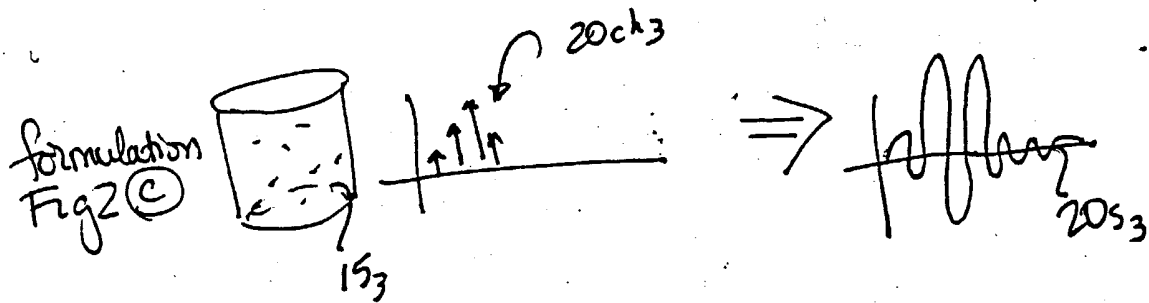
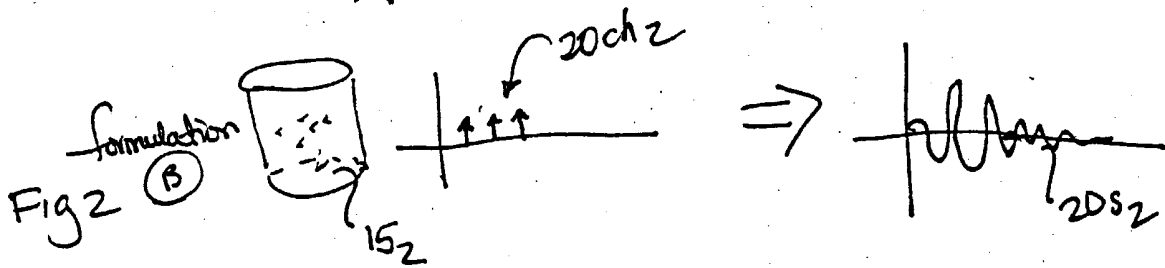
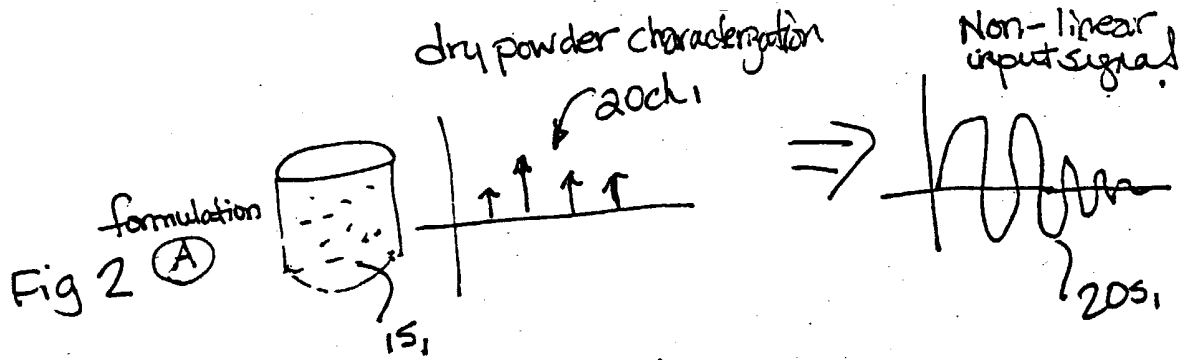


FIGURE 1C



SIGNAL GENERATION ALGORITHM

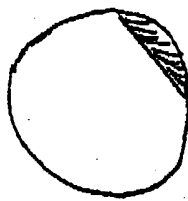
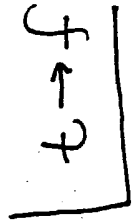


Fig. 3A

Measure time between
advances for
pawls in
rotating drums

Fig. 3B



convert time
to frequency
space

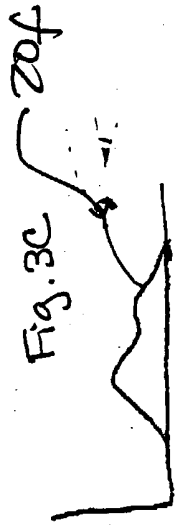


Fig. 3C

plot distribution
of frequencies

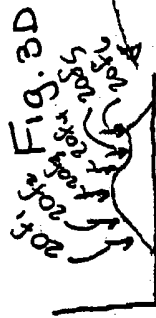


Fig. 3D

Record top six most
observed frequencies,
typically representing
75% of distribution

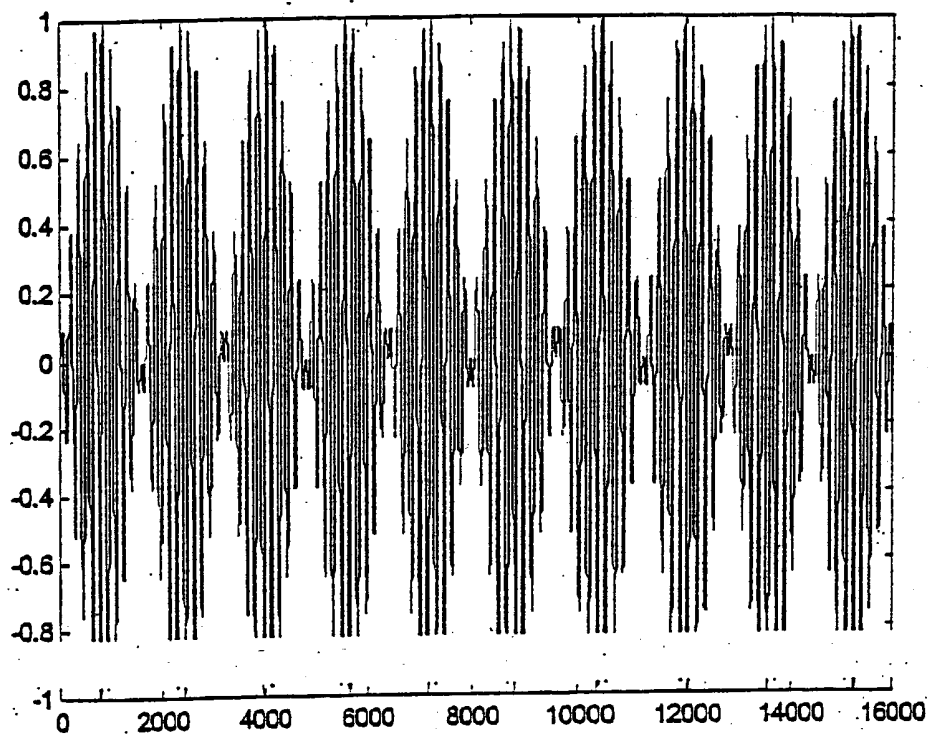
20s



Fig. 3E

Superimpose these six
frequencies to construct
a single superposition
signal (can include
step of adjusting relative
amplitudes)

FIGURE 14



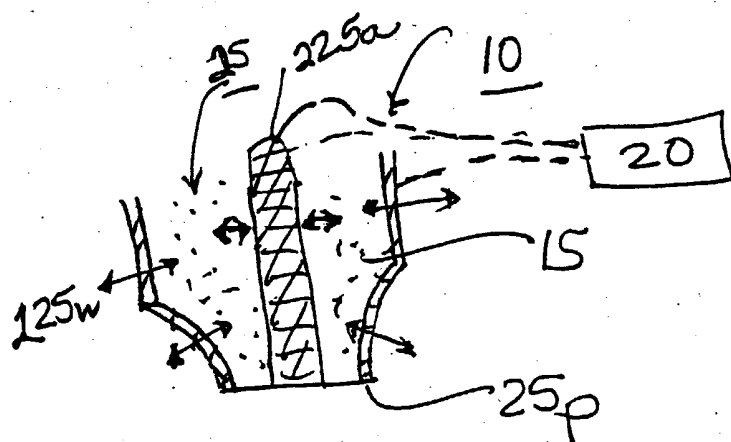


Fig. 5A

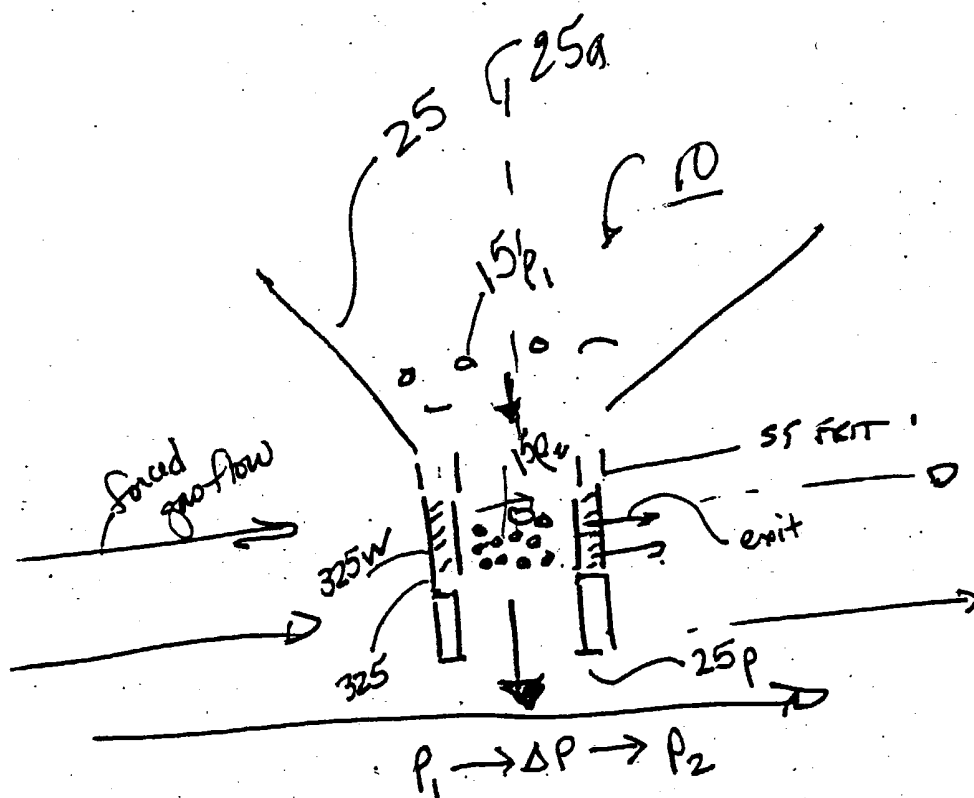


Fig. 5B

NON-LINEAR VIBRATION / CENTRIFUGATION PRINCIPLE OF POWDER FILLING.

BASIC PRINCIPLE:

COMBINE NON-LINEAR FUNCTION WITH CENTRIFUGAL MOTION

THIS CAN BE ADAPTED TO LOCAL NON-LINEAR VIBRATION.

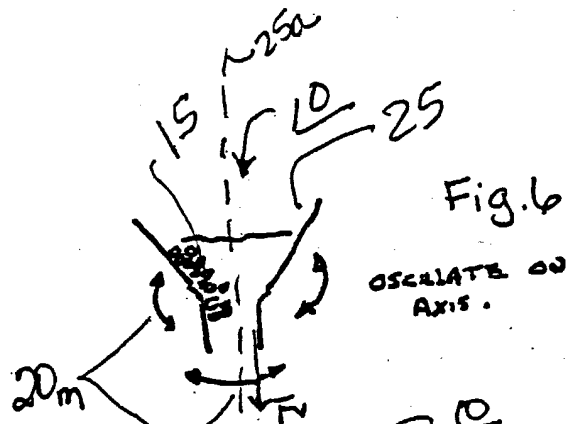


Fig. 6

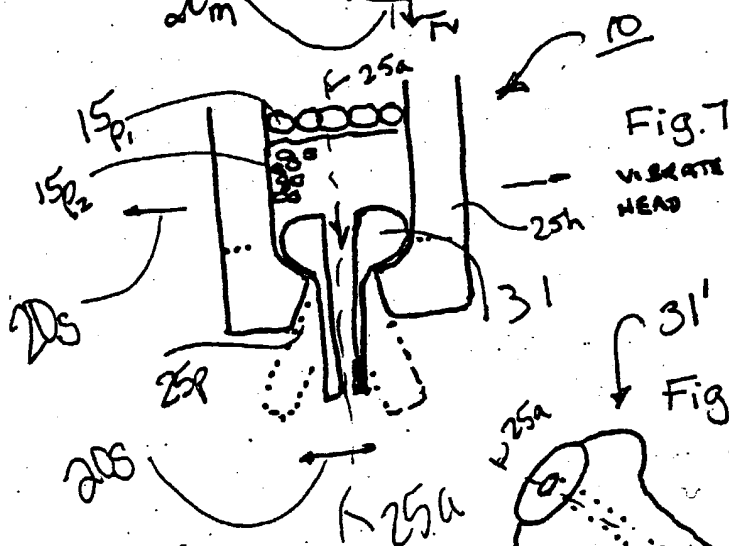


Fig. 7

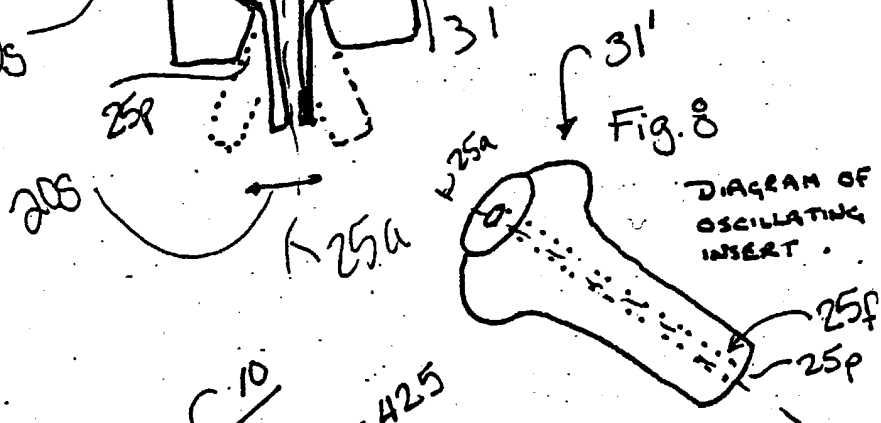


Fig. 8

VIBRATION CAN BE APPLIED TO A RACK OF HEADS FILLING FROM SINGLE HOPPER.

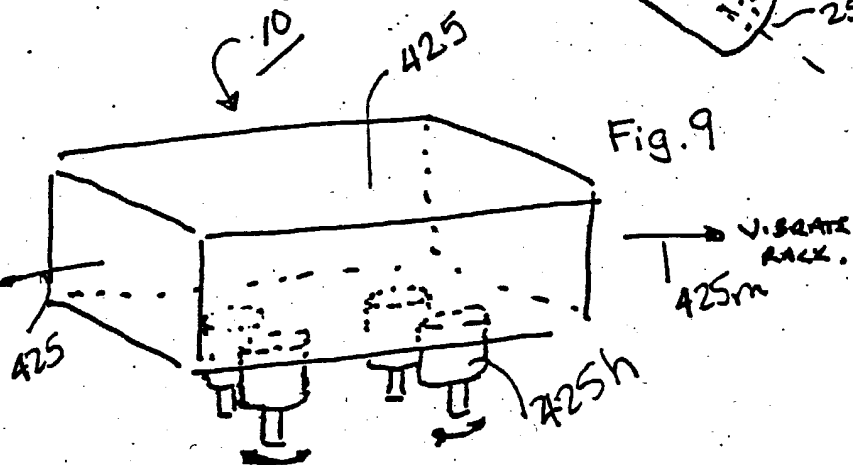


Fig. 9

RADIUS (OR EXTREMES) OF MOTION CAN BE VERY SMALL. AT HIGH FREQUENCY THE ANGULAR VELOCITY WILL BE SUFFICIENT TO GIVE DIRECTIONAL ACCELERATION TO PARTICLES.

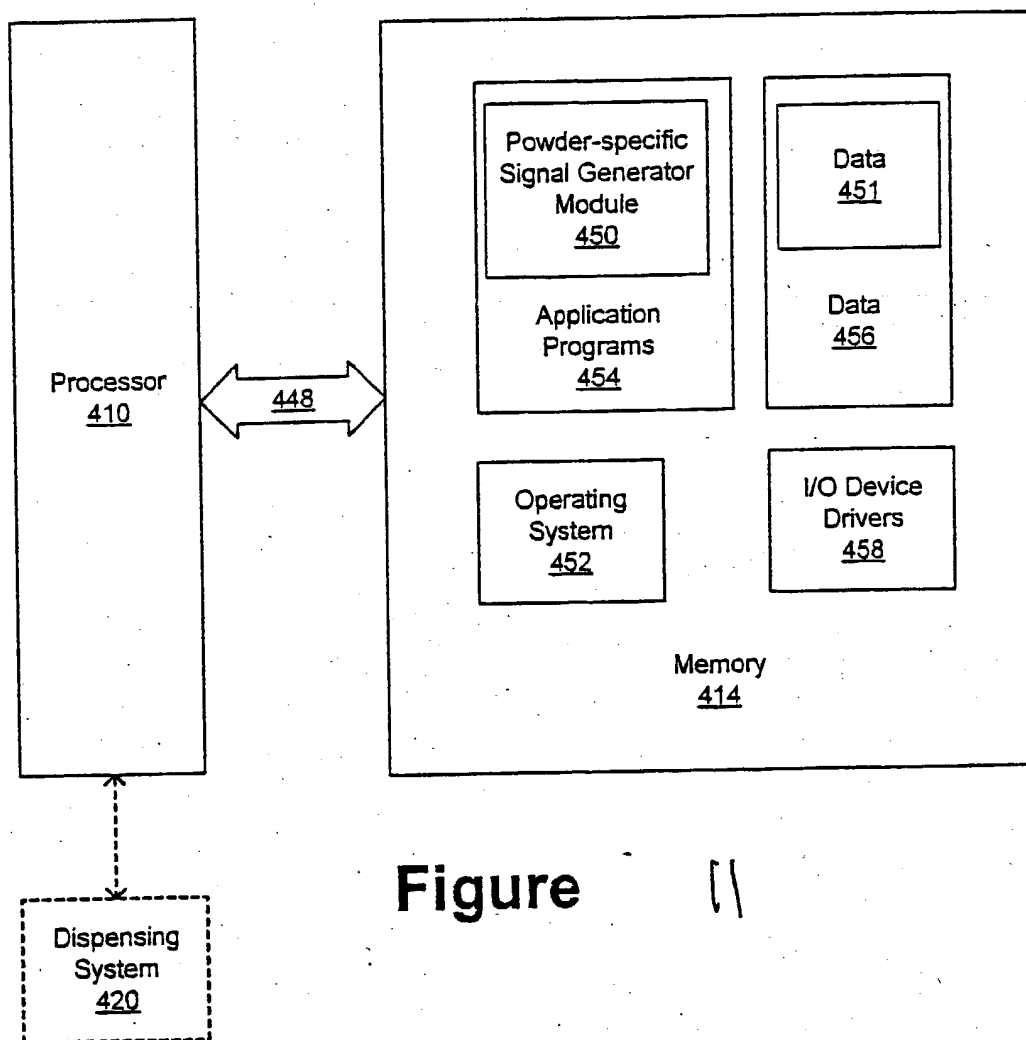


Figure 11

FIGURE 12

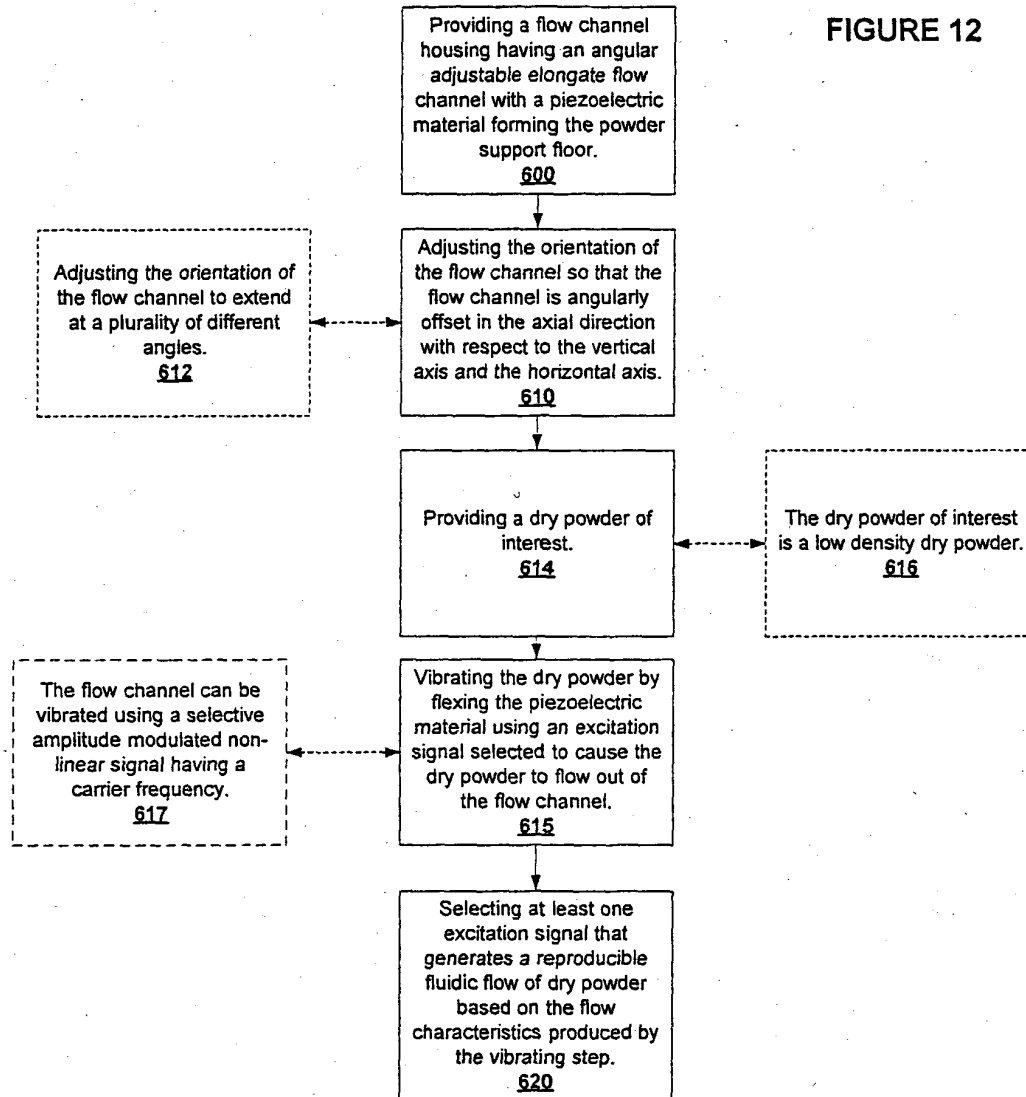
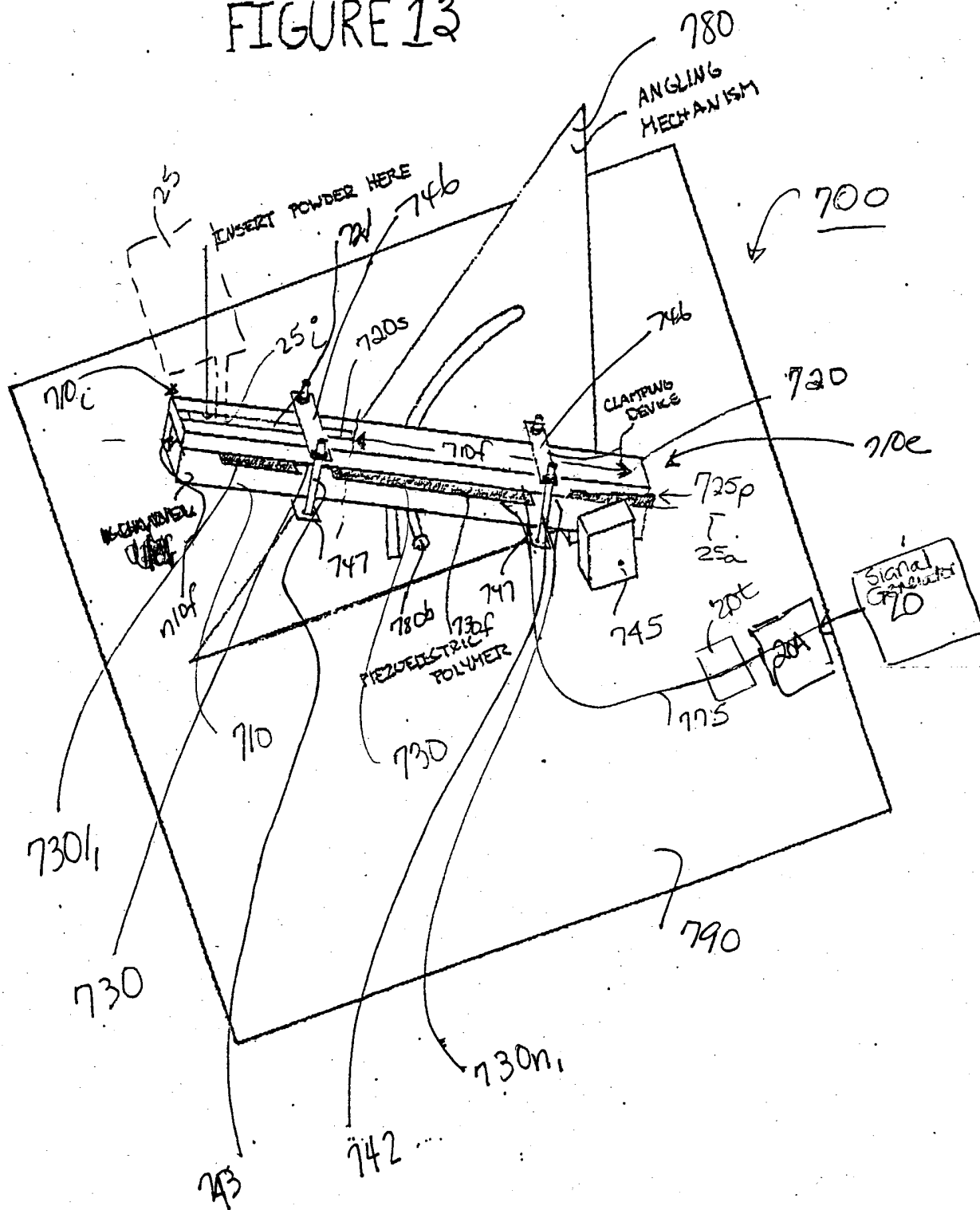
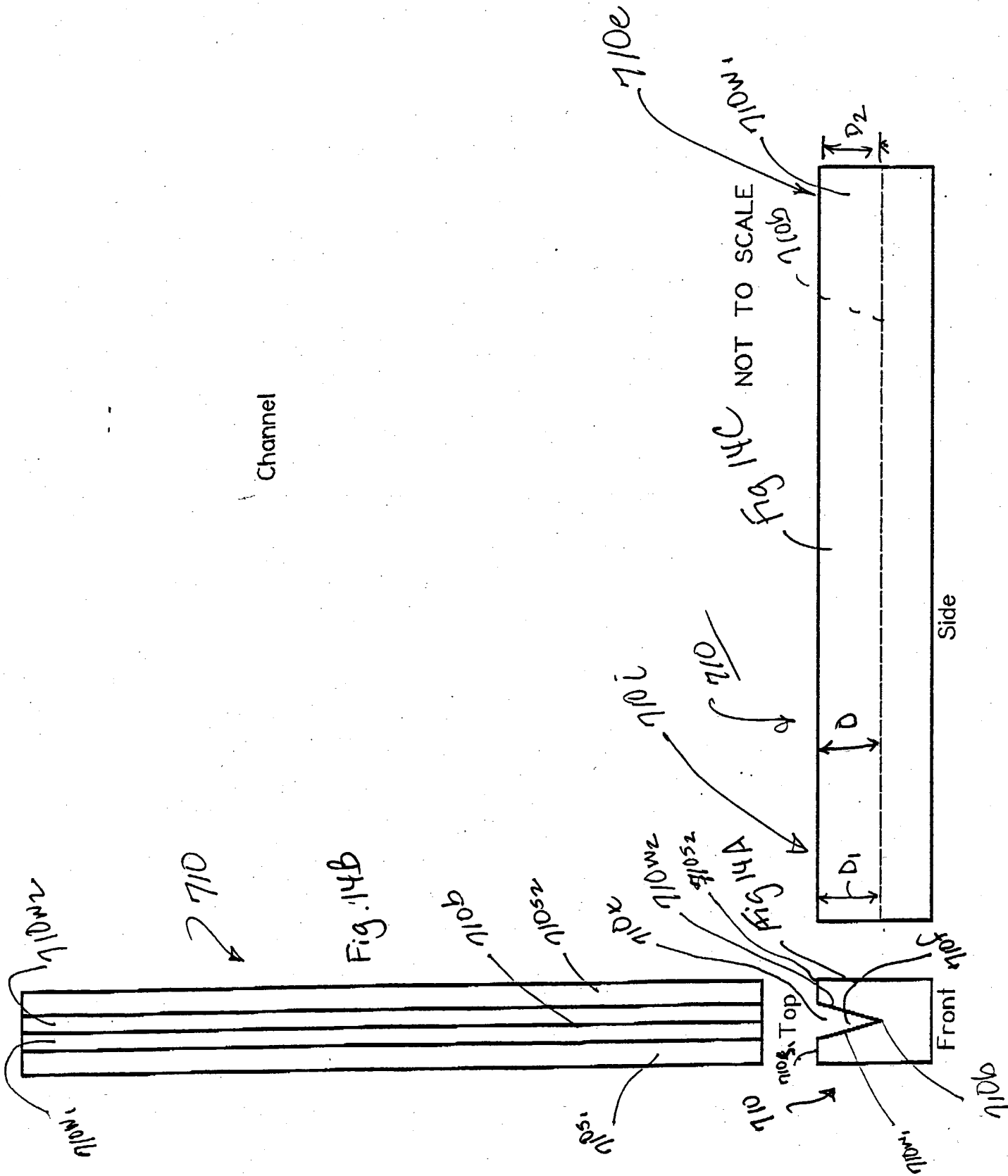


FIGURE 13





Channel

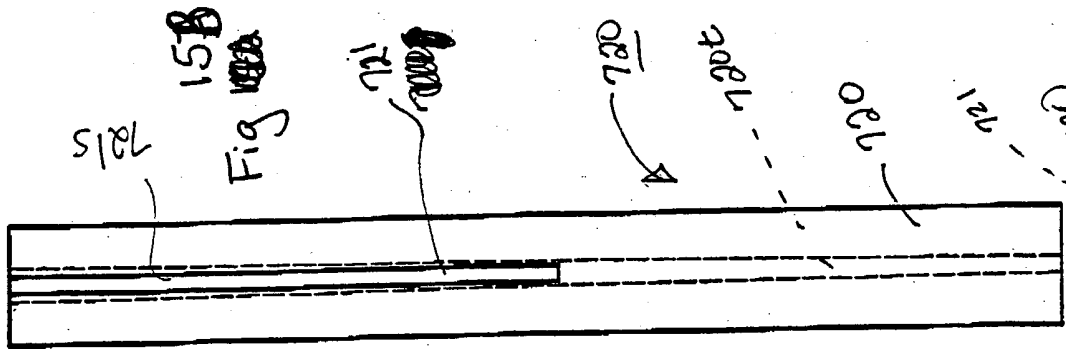
Fig. 14B

NOT TO SCALE

Fig. 14C

Side

Front



15B
Fig 15B

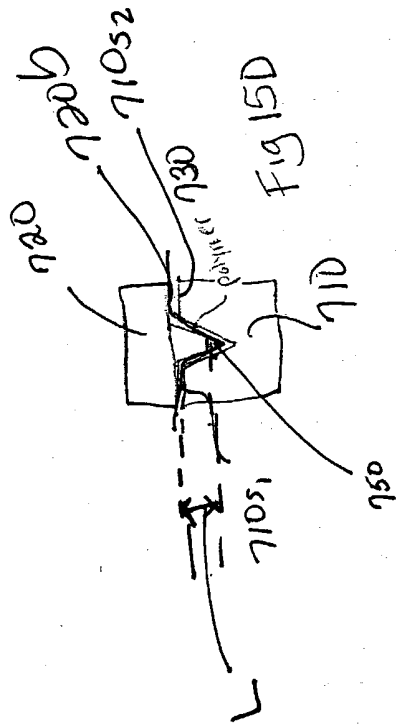


Fig 15D

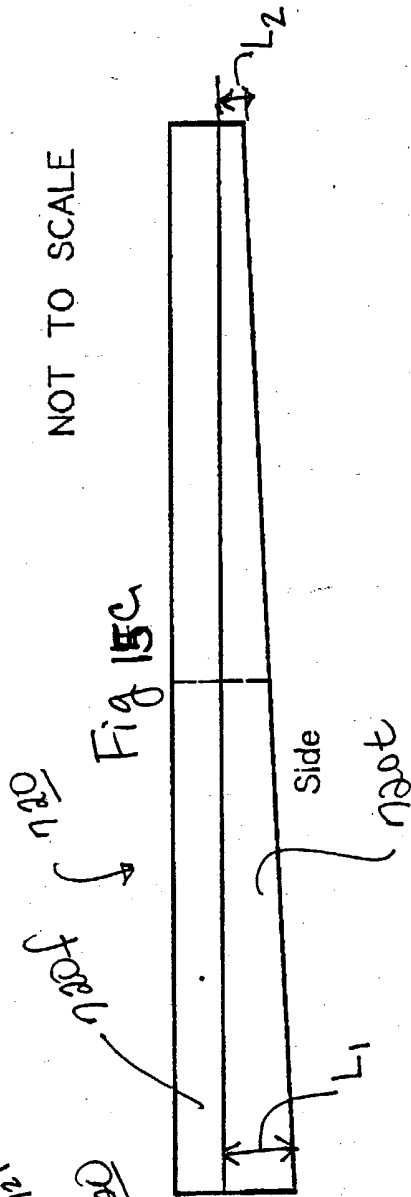


Fig 15C

NOT TO SCALE

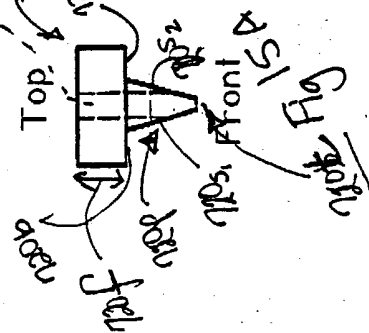


Fig 15A

Part 3: Piezoelectric Polymer
NOT TO SCALE

